Better Buildings Residential Network
Peer Exchange Call Series:
Keeping Up with the Jones': Key Strategies for Behavior Change
September 14, 2017
Call Slides and Discussion Summary

Agenda and Ground Rules

- Agenda Review and Ground Rules
- Opening Polls
- Residential Network Overview and Upcoming Call Schedule
- Featured Speakers
  - **Kira Ashby,** Senior Program Manager, Consortium for Energy Efficiency
  - **Marsha Walton,** Senior Project Manager, Market Insights, New York State Energy Research & Development Authority (NYSERDA) *(Network Member)*
  - **Bridget Clark**, PhD Candidate, Sociology, University of California, Davis
- Discussion
- Closing Poll and Announcements

Ground Rules:

1. **Sales of services and commercial messages are not appropriate** during Peer Exchange Calls.

2. Calls are a safe place for discussion; **please do not attribute information to individuals** on the call.

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Better Buildings Residential Network

Join the Network

Member Benefits:
- Recognition in media and publications
- Speaking opportunities
- Updates on latest trends
- Voluntary member initiatives
- Solution Center guided tours

Commitment:
- Members only need to provide *one number*: their organization's number of residential energy upgrades per year

Upcoming calls:

- September 21: Home Improvement Catalyst: Keeping the Ball Rolling with Homeowners by Delivering More Value
- September 28: Data Overload: Best Practices for Collecting and Using Information
- October 5: Here Comes the Sun: New Advances in Solar and its Connection to Energy Efficiency
- October 12: The Power of IR Diagnostics to Drive Home Upgrades without Incentives

Peer Exchange Call summaries are posted on the Better Buildings website a few weeks after the call

For more information or to join, for no cost, email
bbresidentialnetwork@ee.doe.gov, *or go to* energy.gov/eere/bbrn & *click Join*

Best Practices: Consortium for Energy Efficiency

Kira Ashby, Senior Program Manager

Getting Energy Use Down to a (Social) Science

Applying Behavioral Approaches to Energy Efficiency Programs

CEE
Consortium for Energy Efficiency SM

Kira Ashby
Senior Program Manager, Behavior
September 14, 2017
DOE Better Buildings Peer Exchange Call

Consortium for Energy Efficiency

CEE MISSION

Membership based   Non-profit

As the **Consortium for Energy Efficiency**, United States and Canadian efficiency program administrators develop cutting-edge strategies to accelerate commercialization of energy efficient solutions to benefit gas and electric customers, utility systems, and the environment.
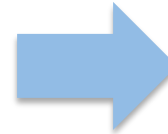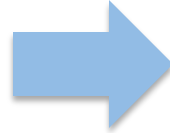
CEE Members
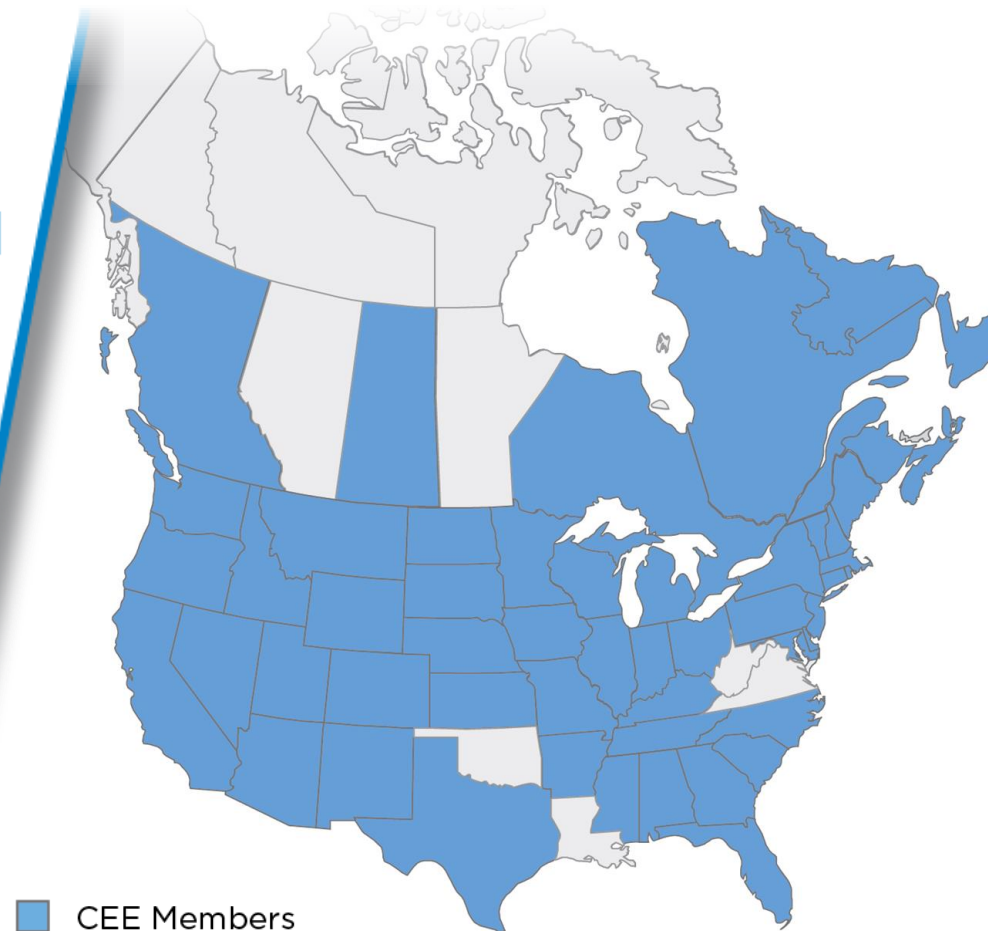
Behavior Insights for Energy Efficiency

Behavior Insights
social norms
public commitment
reciprocity
default bias
anchor bias
single action bias
prompts
above average effect
rewards
discounting
confirmation bias
goal setting
feedback
loss aversion
status quo bias
cognitive dissonance
self-efficacy
modeling
discounting the future

Social Norms

People align their behavior with others' (Cialdini 2007)

Unwritten rules

Application: Home Energy Reports

- Descriptive and injunctive norms
- Raise the bar as you improve

Public Commitment & Goal Setting

Committing publicly ↑ follow through (Burn & Oskamp 1986)

- Telemarketing

Goal setting

- Specific > General

Application: Commit to reduce energy use by specific percent

2030

Reciprocity

Return favors with gift of equal/greater value (Cialdini 2000)

Unsolicited gifts still returned

- In-kind gifts: mailing labels
- The "free" sample

Potential applications: reward behavior <u>before</u> it happens

- **be clear about desired behavioral response**

Default Bias

Default option almost always wins the day

- Opt-in vs. opt-out programs

Application: Thermostat default settings

Anchor Bias

Context and comparisons (Thaler and Sunstein 2008)

Application

- Ranking C&I energy management performance compared to others facilities (scale of 1 to 5)

Prompts

Single Action Bias

Make one change → relieves guilt → less likely to take further action (Weber 1997)
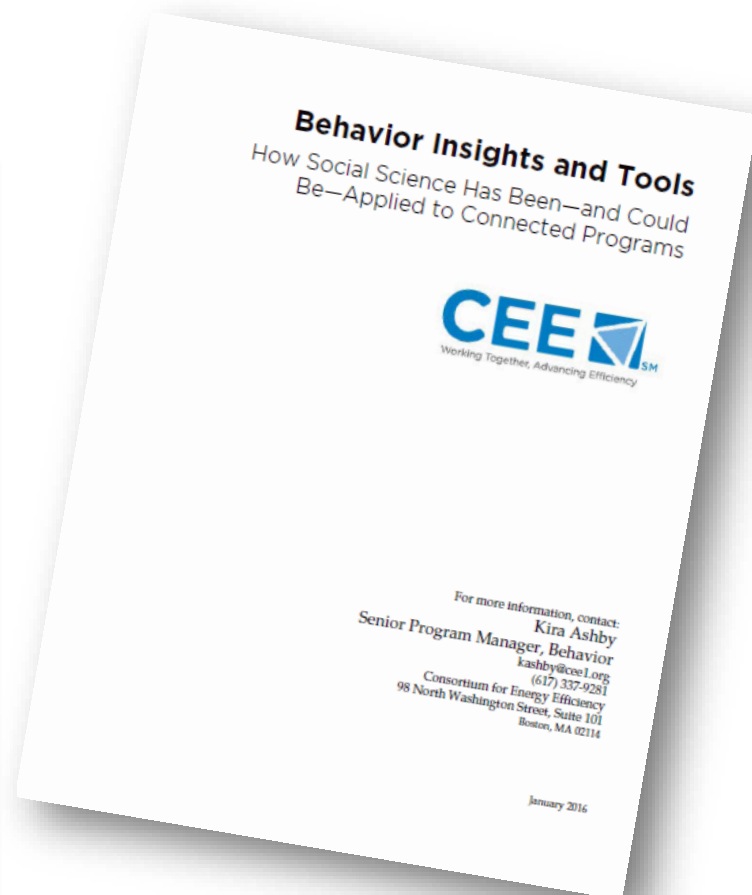
- Recycling

Application: Request pledge for next step

And many, many more!

CEE Behavior work: www.cee1.org/behavior

- **No need to reinvent the wheel:** the same approaches that will make people change their diets, quit smoking or wear their seatbelts can also help them use less energy.

- **People have a tendency to align behaviors to the point that they'll even backslide to be more like others.**
  - Changing to whom people compare their energy use is a way of counter-acting this pattern, which is usually seen in home energy reports: households that improve their energy use will be compared to a group of more efficient households to maintain a high bar.

- **Committing publicly to an action increases follow-through: the more specific the goal, the better.**

- **Pay it forward works: people feel compelled to return any gift with a gift of even greater value.**
  - Rewarding energy efficient behavior before it happens with a clear signal about the desired behavior change can trigger results.

- **Opt-out over opt-in:** it's easier to not make a change than to make a change.
  - Default settings might not always be the most efficient option. People adjusting thermostats to their home needs could have greater savings.

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- **Context matters:** Rating performance across energy management programs can inform their future decision-making and drive improvement.
- **Reminders at the point of decision-making** (e.g. light switch) or push notifications (digital reminders from utilities) can encourage effective behaviors.
- **Making one change relieves guilt and makes it less likely for people to take further action.**
    - Taking one environmental action tends to make people feel they've satisfied their obligation to sustainability in general, and they're less likely to take other similar actions. Have people commit to future actions to prevent single action bias.
- **There is no silver bullet: programs can course-correct if a behavior change technique does not produce the expected results.**
    - In one program example, using normative feedback that sent either happy or sad face notifications to customers based on their energy use resulted in a lot of phone calls and complaints. The program changed their strategy to focus just on the positive to reward efficient behaviors as a result.

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NYSERDA Behavior Research Pilot Results

Marsha L. Walton, PhD
Senior Project Manager, Market Insights

September 14, 2017

NYSERDA Behavior Research & REV

NYSERDA's behavior research pilots use science-based strategies to overcome cognitive barriers to clean energy adoption and behavior change and support Governor Andrew M. Cuomo's strategy **Reforming the Energy Vision (REV).** REV is building a cleaner, more resilient, and affordable energy system for all New Yorkers by stimulating private investment in clean technologies like solar, wind, and energy efficiency. REV goals:

- Reduce greenhouse gas emissions 40 percent by 2030, and 80 percent by 2050

- 50 percent of the State's electricity will come from renewable energy sources by 2030.

- To learn more about REV, including the Governor's $5 billion investment in clean energy technology and innovation, please visit www.ny.gov/REV4NY and follow us at @Rev4NY.

Cognitive barriers

- risk aversion *

  new technologies, with high upfront costs

- potential losses vs. potential gains

- status quo bias *

- discounting

- preference for quick vs. deliberative decision making

- out of sight, out of mind *

Behavioral strategies

- case studies/social modeling √

- normative feedback √

- insurance policies

- leasing plans

- default settings √

- trusted experts, trained workforce √

- prompts, signs/smart phones/reminder messages √

NEW YORK STATE OF OPPORTUNITY. | NYSERDA

1. Influencing condo/co-op boards in NYC to upgrade common area lighting to LED lighting

Brockport Research Institute

First Service Residential/FS Energy
SUNY Brockport

Strategies: Social event, tailored worksheet highlighting LED opportunities & economic benefits, social and normative feedback, and case studies

Results: 25% of buildings whose board members attended the social event and completed tailored LED worksheets voted to install LED lighting (compared to 7% in the control) resulting in 20,000 kWh monthly savings across 7 buildings.

Evening attendance at the social events was a challenge with 35% and 26% attendance at the two dinner events.

Future research should consider providing tailored LED lighting proposals to board members at their regular board meetings.

2. Helping students living in the Smart Dorms at Clarkson University conserve electricity & hot water

Clarkson University
>IBM

Strategies: Motivational workshops, personal commitments and real-time kWh & water feedback vs. monthly statements

Results: Students who attended the motivational workshop, received real-time feedback on a tablet mounted on the dorm wall and shower orbs used 21% less electricity and 20% less hot water.

Students who received real-time feedback and shower orbs (but no workshop) did not show significant reductions in electricity or hot water usage.

Students who participated in the motivational workshop and received a monthly statement of their energy and water usage (without real-time feedback) reduced their hot water usage by 20% but did not reduce electricity usage.
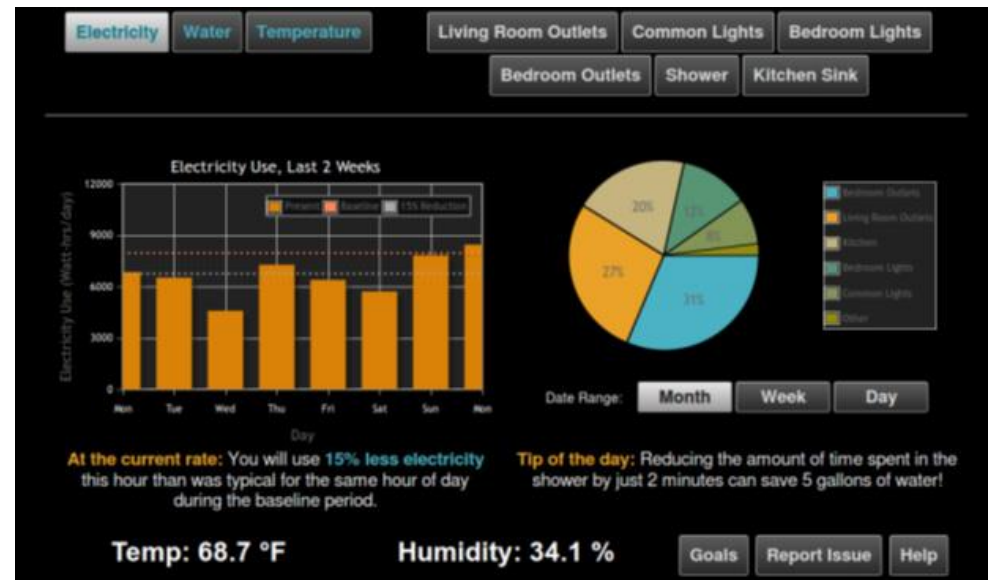
3. Increase use of thermostat setbacks in multifamily housing to reduce energy use

Fraunhofer USA Center for Sustainable Energy Systems

Albany Housing Authority

Strategies: Programmable thermostats, customized programmed thermostat setbacks, commitment, and prompts

Results: Custom-programed thermostat setbacks with prompts to go back to programmed settings effectively influenced residents to use programmed settings to save energy.

Households who received custom settings (but were not asked to sign a commitment) used 1.8% less energy compared to the control group.

Households who received custom settings *and* signed a commitment to use programmed setbacks used 1.1 % less energy over the winter heating season.

Future research should encourage households to consider setting back nighttime temperatures several degrees lower than normal to save energy.

4. Conserving summer window air-conditioning usage in non-metered multifamily housing

Action Research

Green City Force & Multifamily Housing Landlord

Strategies: Social norms, normative feedback, ambient temperature thermometer, energy saving tips, prompts, and intrinsic primes

Results: In-person delivery of normative feedback, room thermometer & tips on reducing summer AC use resulted in 3.1% savings for 2 months without persistency of savings.

Under-the-door delivery of the same resulted in 5.7% savings for 3 months and average savings of 3.6% over the following 10 months.
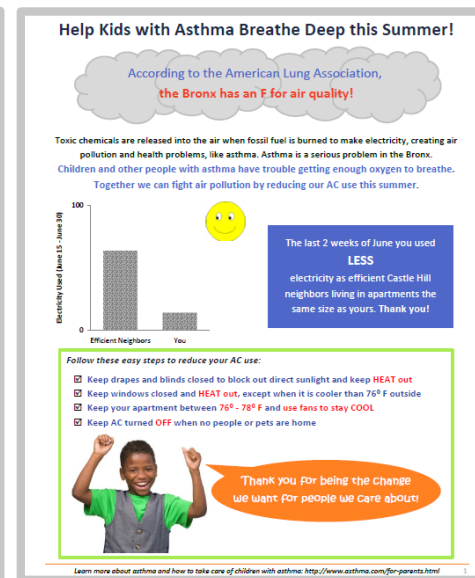
Under-the-door delivery of the same plus the intrinsic prime resulted in 1.1% savings for 3 month without persistency.

Future research should test postal delivery of the most successful condition.

Normative feedback & tips
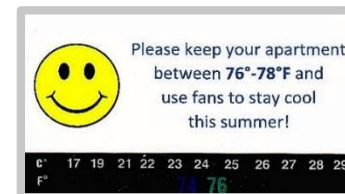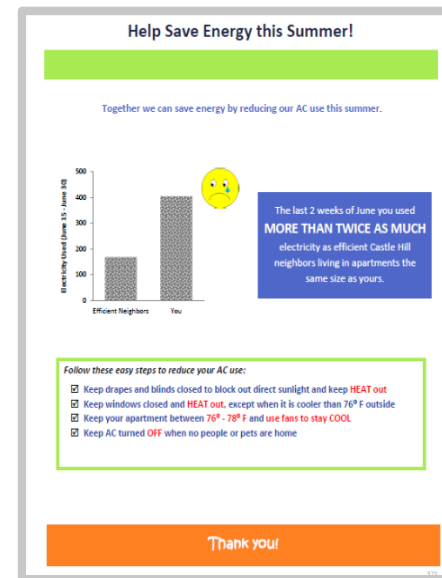
Normative feedback, intrinsic prime & tips

NYSERDA Behavior Research
Summary of Key Findings

- Social settings with expert and peer presentations, and customized lighting reports influenced LED adoption by condo and co-op board members, but attendance at the evening social events was a challenge.

- Motivational workshops combined with personal commitments and *monthly* kWh and hot water feedback to students living in college dorms reduced hot water consumption by 20% and when combined with *real-time* electricity feedback it also reduced electricity usage by 21%.

- Programming customized setback thermostat schedules for renters who pay their utilities increased use of programmed settings & reduced energy used for heating by ~2%.

- Providing normative feedback, tips and prompts to reduce summer AC use to renters who do not pay utilities reduced summer electricity consumption by ~6% and led to persistent electricity savings of ~4%.

APPENDIX: Encouraging students to turn off unused computers in computer labs

Action Research
Ithaca College

Strategies: Prompts, Default Settings, Norm Activation (Injunctive & Descriptive)

Results: When unused computers were maintained in an off mode by computer lab proctors and prompts to turn off unused computers were posted, there was 48% compliance compared to 3% compliance when unused computers were left on and prompts were not posted.
When unused computers were turned off and prompts were not posted, there was a 15% compliance compared to 11% compliance when unused computers were left on and prompts were posted.

Ithaca Green Machine
Please turn off the computer & monitor when you are done
ITHACA

- **Promoting energy efficiency through social events may yield mixed results.**
  - NYSERDA's pilot promoting LED lighting to condo/co-op board members in two social events had limited attendance (between 26%-35%) and had high organizational costs.
  - Sharing flyers at board meetings or via mail might be more cost-effective to implement moving forward.
- **Motivational workshops are key in prompting change.**
  - The Smart Dorms pilot at Clarkson University showed that real time feedback on energy usage alone did not result in greater savings. However, when feedback was coupled with workshops, students saved up to 21% energy.
- **Efficiency of normative feedback may depend on the delivery channel.**
  - Asking residents to reduce summer AC use through smiley face messages indicating how they compare to their neighbors reduced energy consumption by ~6%. Under-the-door delivery proved to be more effective than in-person delivery in terms impact on behavior.

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- **Leveraging customized thermostat setbacks can lead to greater energy savings if homeowners maintain the recommended settings.**
    - Setting the thermostat at 68ºF - 70ºF during inoccupancy and overnight for multifamily households, led to up to 1.8% savings on heating bills during the winter in a NYSERDA pilot.
    - This cost-effective approach could be further tested by utilities in the future by providing customers with recommended thermostat settings remotely.
- **Low-income residents might be harder to influence, since their attention is split between many other issues.**
    - Socio-economic factors can impact a person's ability and bandwidth to focus on energy efficiency, and make them less susceptible to behavior change. Messages targeted at lower income customers should be simple to understand, and use prompts and clear directions that can be followed easily.

Getting to 80%: Mobilizing Feedback, Lifestyles, and Social Practices Research to Shape Residential Energy Consumption

Bridget A. Clark
PhD Candidate
University of California, Davis
@BClarkSociology

Limitations of the Physical-Technical-Economic Model (PTEM):

- Current policy efforts focus on technology and tend to ignore humans as the key users of energy (Lutzenhiser et al 2009)

- Residential energy consumption for California from 1980-2000 grew by 49% (Brown & Koomey 2003)

    - Attributed to increased housing square footage and appliance usage (Moezzi & Diamond 2005)

- "Rebound Effects"- the ratio of lost energy savings compared to the total expected energy savings from efficiency gains

© Can Stock Photo - csp9649746
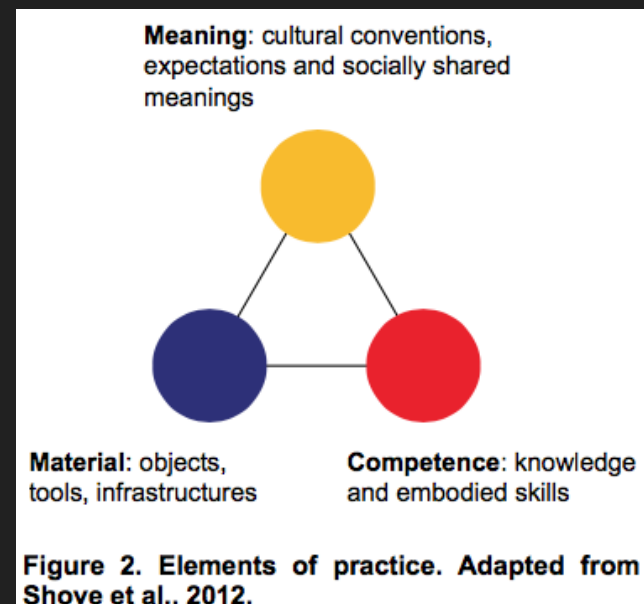

Behavior Change Ahead?

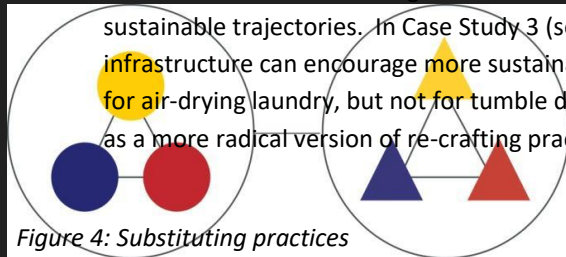# Social Scientists' critique of the PTEM framework:

1. Energy is invisible

2. Energy is consumed socially through groups (families, organizations, etc.) rather than individually

3. Energy use is socially and culturally constructed. (Wilhite et al 1996)

Embedding Residential Energy Consumption: Social Practice Theory and Shifting Habits

- Three basic elements of a social practice: 1) materials; 2) competencies; 3) meanings (Shove, Pantzar, and Watson 2012).

- Notions of comfort, cleanliness, and convenience shape energy service consumption (Shove 2003).

Meaning: cultural conventions, expectations and socially shared meanings

Material: objects, tools, infrastructures

Competence: knowledge and embodied skills

Figure 2. Elements of practice. Adapted from Shove et al., 2012.

Figure 4: Substituting practices

Reduce the resource intensity of existing practices through changing the elements that make up those practices.

1. Re-crafting practices
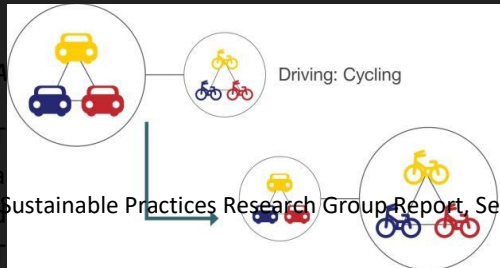
Replace less sustainable practices with more sustainable alternatives.

2. Substituting practices

Sustainable Practices Research Group Report, September 2013.
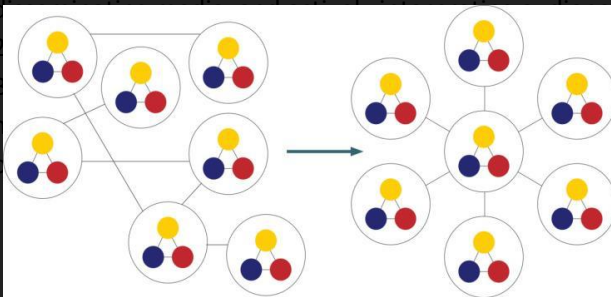
Harness the complex interactions *between* practices, so that change ripples through interconnected practices

3. Changing how practices interlock

Figure 5: Changing how practices interlock

Three basic strategic approaches to practice-based policy interventions (Spurling et al 2013)

An Example of Changing how Practices Interlock: Liverpool Central Library

Though not explicitly designed to change locations of work, the refurbished Liverpool Central Library is a new kind of city centre space, which speculatively, might bring about this kind of change (http://www.liverpool.gov.uk/libraries/find-a-library/central-library). The inclusion within the

## Uncovering specific practices:

- Crosbie (2008) on consumer electronics

- Gram-Hanssen (2010a) on heating practices

- Gram-Hanssen (2010b) on stand-by consumption

- Hand, Shove, Southerton (2005) on showering practices

- Hand and Shove (2007) on practices around freezers
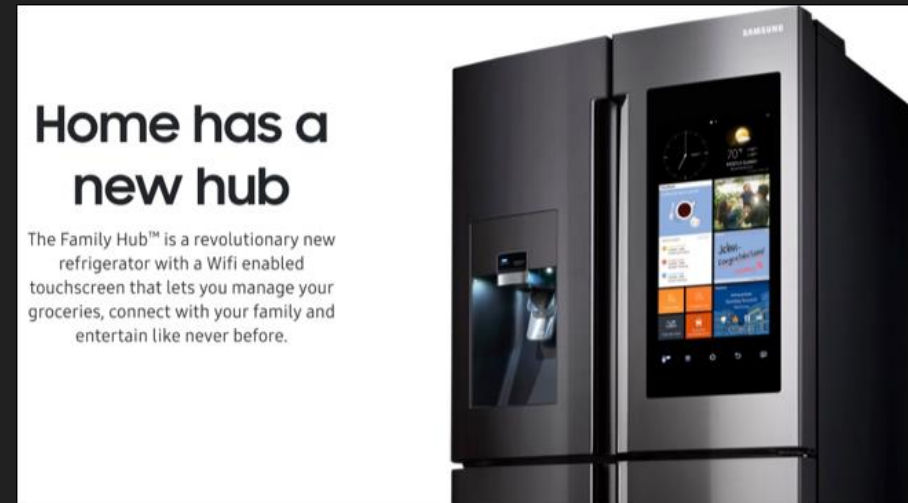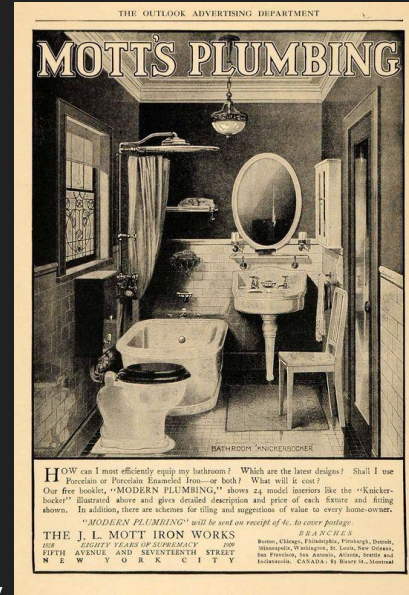
Case: Home lighting practices

● Crosbie and Guy (2008)- what caused the shift from a single ceiling bulb to multi-source lighting?

●How to create a "stylish", "cozy", "comfortable homes"? Need to shift cultural meanings around lighting rather than simply promote energy-efficient light bulbs. Suggests that the UK should work with lighting designers, advertisers, and retailers to promote the aesthetic appeal of environmentally friendly lighting.
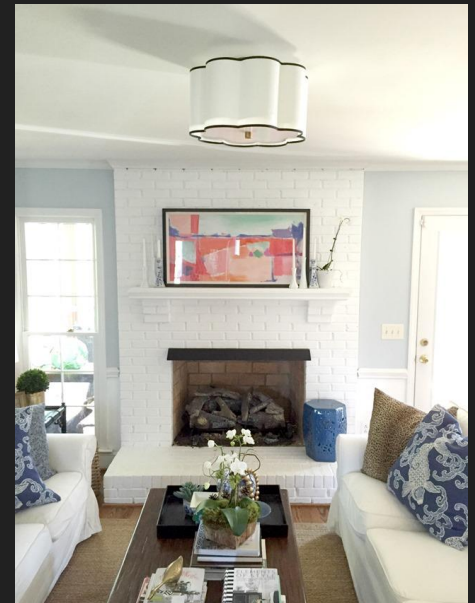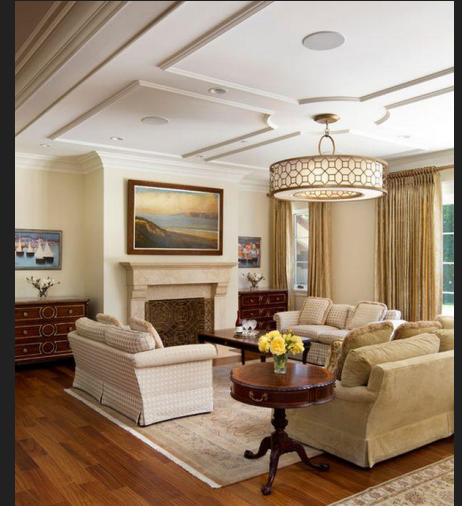
Policy model: Japan's Cool Biz initiative

COOLBIZ
クールビズ

● By changing the meaning of "work appropriate" attire in addition to mandating in-door air temperature standards the Japanese were able to save an reduce CO_2 emissions by 1.72 million ton in 2007.

Brown, Richard E. and Jonathan G. Koomey. 2003. "Electricity use in California- past trends and present usage patterns". Energy Policy 31: 849-864.

Crosbie, Tracey. 2008. "Household energy consumption and consumer electronics- The case of television". Energy Policy 36: 2191-2199.

Crosbie, Tracey and Simon Guy 2008. "Enlightening energy use- the co-evolution of household lighting practices". International Journal of Environmental Technology and Management 9: 220-235.

Lutzenhiser, Loren. 2009. "Behavioral Assumptions Underlying California Residential Sector Energy Efficiency Program". Prepared for CIEE Behavior and Energy Program.

Gram-Hanssen , Kirsten. 2010a. "Residential heat comfort practices understanding users". Building Research & Information 38.2: 175-186.

--------. 2010b. "Standby Consumption in Households Analyzed with A Practice Theory Approach". Journal of Industrial Ecology 14.1: 150-165.

Hand, Martin and Elizabeth Shove. 2007. "Condensing Practices: Ways of living with a freezer". Journal of Consumer Culture 7.1: 79-104.

Hand, Martin and Elizabeth Shove, and Dale Southerton. 2005. "Explaining showering: a discussion of the material, conventional, and temporal dimensions of practice". Sociological Research Online 10.2.

Moezzi, Mithra and Rick Diamond. 2005. "Is Efficiency Enough? Towards a New Framework for Carbon Savings in the California Residential Sector". Prepared for the California Energy Commission, Public Interest Energy Research Program.

Shove, Elizabeth. 2003. Comfort, Cleanliness and Convenience: The Social Organization of Normality. Oxford: BERG.

Shove, Elizabeth, Mika Pantzar, and Matt Watson. 2012. The Dynamics of Social Practice: Everyday Life and How It Changes. Los Angeles: Sage Publications.

Spurling, Nicola, Andrew McMeekin, Elizabeth Shove, Dale Southerton, Daniel Welch. 2013. "Interventions in practice: re-framing policy approaches to consumer behavior". Prepared for Sustainable Practices Research Group Report (September).

Wilhite, Harold, Hidetoshi Nakagami, Takashi Masuda, Yukiko Yamaga, and Hiroshi Haneda. 1996. "A cross-cultural analysis of household energy use behavior in Japan and Norway". Energy Policy 24.9: 795-803.

- **People consume energy services (e.g. heating, lighting), not energy itself.**
- **Energy consumption is rarely individual,** but rather socially determined.
- **Home lighting has increased in the last years,** mostly because multi-source lighting has been promoted as more appealing.
  - Manufacturers and retailers could encourage a reduction in the number of lighting sources in a room to promote greater energy savings.
- **The current focus on technology makes people forget that the simplest choices are within their reach.**
  - Favoring natural lighting during the day could lead to more energy savings.

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- **Hot and cold may bear different meanings now than in the past.**
    - **Socially embedded practices may explain certain inefficient behaviors.** Setting the AC at 68˚F during summer has its origins in the attire worn in the workplace in the past. People need a cultural shift to realize that today they can be comfortable at higher temperatures as well.
    - **In 2005 Japan promoted the short-sleeved outfits** in the workplace to encourage less energy use on cooling buildings, which led to significant energy savings.
    - **UC Davis is currently conducting a feedback study asking people to define what's too hot and too cold.** Based on the assumption that people are consuming comfort, utilities may have to shift their thinking from energy use to asking people if they're comfortable.
    - This kind of thinking could be applied in the residential sector as well.

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Discussion Highlights: What are the gaps in knowledge for this topic that, if filled, would help improve work in this area?

Great progress has been made on behavior change strategies for energy efficiency, but there's still a lot to discover. **More research is needed into the following topics:**

- **The effectiveness of various techniques and their potential to change behavior.** Which strategies are most effective and for whom?
  - Pricing will produce quick behavioral changes.
  - Framing the feedback in terms of health benefits, will trigger fewer behavioral changes, but more durable.
- **Demographic characteristics and tailored messages/strategies.**
  - **Women VS Men**: Energy efficiency starts in the home – studies indicate that men tend to pay more attention to technology, while women to family and comfort-related messages.
  - **High-income VS low-income**: Different households will react to different messages, since low-income households often have many other issues to deal with.

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Additional resources

- [CEE Behavior Resources](#): houses a variety of resources on applying behavioral approaches to energy efficiency programs, including an annual summary of behavioral energy efficiency programs, a report on behavioral persistence, and other related topics.
- [CEE Behavior Insights and Tools](#): provides an overview of 40+ behavioral social science techniques (including those I mentioned in my presentation today); includes an explanation of each behavioral insight, examples of how it's been applied to energy efficiency, and detailed case studies on programs that have used each of these behavioral techniques.
- [Ideas42](#), a non-profit behavioral economics and consulting firm, has done research on low-income audiences.
- Study from a student of the University of Alaska Fairbanks on "[Valuing Residential Energy Efficiency in the Anchorage Real Estate Market: A Hedonic Approach](#)".

Upcoming Seasonal Messaging Opportunities

Now is the time to start planning energy efficiency messaging!

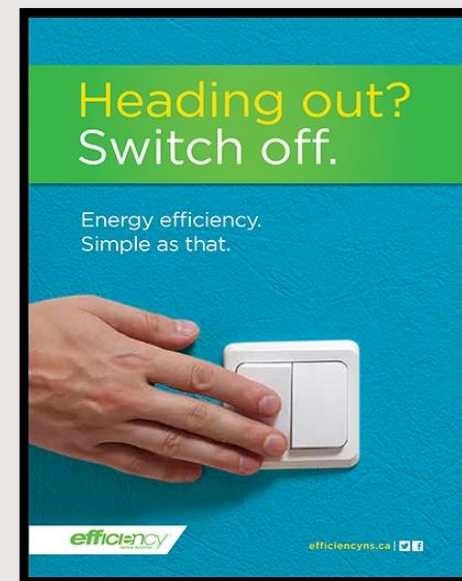**Dec 21 – March 19**
Winter season

December
Winter Holidays
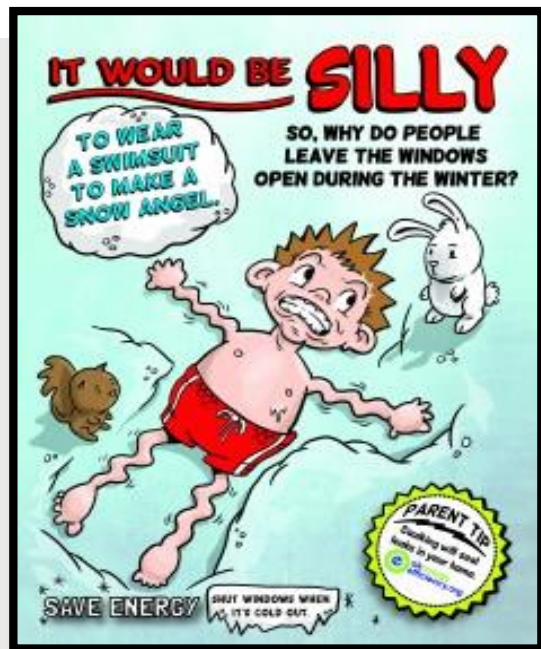
Alaska Energy Efficiency
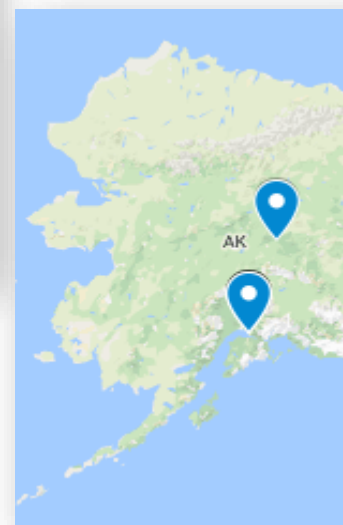Poster

Fuel Fund of Maryland
Poster

Efficiency Nova Scotia
Facebook Post: You deserve a break. So does your power bill. Remember to do this before you go on #holiday!

Addenda: Attendee Information and Poll Results

Call Attendee Locations

Call Attendees: Network Members

- Advanced Energy
- Alaska Housing Finance Corporation
- Boulder County
- Center for Energy and Environment
- Center for Sustainable Energy
- City of Cambridge
- City of Chula Vista
- City of Fort Collins
- City of Kansas City
- CLEAResult
- Cold Climate Housing Research Center
- Cool Choices
- Eden Housing
- Efficiency Maine
- Elevate Energy

- EnergyWize
- Greater Cincinnati Energy Alliance
- International Center for Appropriate and Sustainable Technology (ICAST)
- New York State Energy Research & Development Authority (NYSERDA)
- Resynergy Systems
- Richmond Region Energy Alliance (RREA)
- Rural Ulster Preservation Company (RUPCO)
- South Burlington Energy Committee
- Southeast Energy Efficiency Alliance (SEEA)
- TRC Energy Services

- ABC Energy Savings
- Americorps
- Appalachian Voices
- Armando Cobo, Designer
- Ballarat Consulting
- Bay City Electric Light & Power
- Bidgely blog
- California Public Utilities Commission
- Canadian Home Builders' Association (CHBA)
- City of Asheville
- City of Orlando
- Clallam County
- Climate Smart Missoula
- Comfort Institute
- CSRA Inc.

- DBR Engineering Consultants, Inc.
- Delaware Division of Energy & Climate
- Dimensions-Energétiques
- DNV GL
- Eesny
- EnergyWorks
- Green Energy Committee
- HDR Consulting
- Heartwood Solutions Consulting
- HG Realty Services
- Hunter Douglas
- ICF International, Inc.
- Integrative Design & Architecture
- Jofforts Computer Industrial Inc.
- LEENA Labs
- Local Government Commission

- Lockheed Martin
- Louisville Gas & Electric
- Mercy Housing Management Group
- NANA Regional Corporation
- Nashville Metro Government
- National Renewable Energy Laboratory (NREL)
- Natural Resources Canada
- Open Energy Efficiency
- Pacific Northwest National Laboratory
- Pennsylvania Housing Research Center
- Pennsylvania Technical Assistance Program (PennTAP)
- PV Blue

- Renewable Energy Alaska Project
- Rhode Island Housing
- Rochester Housing Authority
- Seattle City Light
- SES Consulting Ltd
- Smaart House
- Studio Jack Rees
- The Energy Coalition
- The South-central Partnership for Energy efficiency as a Resource (SPEER)
- US Arctic Research Commission
- Utah Governor's Office
- Utah Governor's Office of Energy Development
- Vermont Energy Investment Corporation (VEIC)

Opening Poll #1

- Which of the following best describes your organization's experience with strategies for behavior change?

  - Some experience/familiarity – *49%*
  - Limited experience/familiarity – *30%*
  - Very experienced/familiar – *15%*
  - No experience/familiarity – *4%*
  - Not applicable – *2%*

Closing Poll

- After today's call, what will you do?

    - Seek out additional information on one or more of the ideas – *75%*

    - Consider implementing one or more of the ideas discussed – *22%*

    - Make no changes to your current approach – *3%*

    - Other (please explain) – *0%*